Is this very much a matter of faith? A monetization approach to covid-19

IS THIS VERY MUCH A MATTER OF FAITH? A MONETIZATION APPROACH TO COVID-19

Abstract

COVID-19 pandemic and resulting global economic contraction will stress all Countries' fiscal frameworks raising several concerns about real and effective possibilities to deal with all deriving issues. The magnitude of shocks will surely affect the fiscal deficit and public debt in the majority of them. The sustainability and the survival of present worldwide economic system is severely tested. Through the application of the Granger causality methodology, the historical series of monetary aggregates and inflation are analyzed for different countries. The goal of this empirical analysis to support an unconventional approach to the solution of a crisis that has pervaded all nations and economic systems.

JEL codes:
E02 Institutions and the Macroeconomy, E31 Inflation, E51 Money Supply, E58 Central Banks and Their Policies

Keywords: Inflation, Money, Covid-19, SARS-CoV 2, Monetization, Systems

1. Introduction

Covid-19 appeared in Wuhan (China) by December 2019 and rapidly spread to the rest of the World (Filipe, 2021). Present COVID-19 pandemic crisis will severely affect public health and economic systems. From an economic point of view, forecasts estimate a contraction in GDP for the 2020 FY of several points. For the Countries examined in the present work, and included in the last issue of the Statistical Annex European Economic Forecast (Spring 2020), the predictions are: Argentina (-5.5%), Italy (-9.5%), Japan (-5%), United Kingdom (-8.3%) and USA (-6.5%). If these estimates are confirmed at the end of the year, the scenario will be truly worrying. The stability of the World economic system is truly put to the test. Similar figures are found for industrialized Countries in recent economic history only during the Second World War period. Italy experienced a yearly average decreasing rate equal to -7.16% between 1939 and 1945. Japan recorded a downturn of -10.7% between 1941 and 1945, and the GDP fall for the UK was at a -3.6% rate between 1943 and 1947. For what concerns the USA, they did not experience war damages on their territory, a more solid benchmark can be found in the Great Depression time span (1929-1933) where the corresponding contraction rate of the economy was equal to -7.76%. The elaborations on historic data are deriving from figures collected in Bolt et al. (2018). In order to have economic terms of comparison, the current Governments have to face periods similar to those of a war conflict. The whole socio-economic system will suffer from this terrible situation.

Consistent with such concerns considering what alternatives can be concretely and fairly practicable to face this dramatic problem, the purpose of the paper is to investigate whether a monetary solution can be advanced. Solutions deriving from unconventional monetary approaches are generally opposed as they are held responsible for potential inflationary pressures that cannot be controlled. To this aim, a Granger analysis is applied between the inflation and the money supply. Being aware of the fact that empirical analysis could be considered as somewhat specific to the

period covered by the dataset, we try to overcome this shortcoming by gathering the longest time series when available. Moreover and intentionally, the paper extends the period of analysis to Countries with very different economic structures and financial regulatory frameworks.

Our findings do not suggest the existence of meaningful relationship between the variables.

The rest of the paper is structured as follows. The next section briefly reviews and discusses the main aspects on the money-inflation relationship also considering some up-dated proposals on the subject. Section 3 provides the methodology and the data descriptions. Section 4 presents the empirical results and findings. Finally, Section 5 concludes with policy implications.

2. Background and considerations about the money-inflation mechanism

Economic depressions recur over time. The scholars of the subject have also theorized the existence of specific cycles. Literature tries to classify cycles following their average duration (Reijnders, 2009): Kitchin cycles (3-5 years), Juglar cycles (7-12 years), Kuznets cycles (15-25 years), Kondratieff cycles (40-60 years) and Hegemonial cycles (over 60 years). Economists generally disagree on the genesis of the crises and their descriptions. In addition to classical economic aspects, financial factors (Minsky, 1992) have been integrated into long-run theoretical frameworks (Bernard et al., 2014). Despite the disagreements on causes and recipes, there is a consensus with historians that capitalist systems oscillate between alternating phases of prosperity and depression (Adelman, 1965).

From a macroeconomic perspective, also this pandemic crisis can be traced back to the various shocks that can afflict the system. Possible interventions through traditional economic policy instruments raise several issues (Corsi, 2020). In this sense goes the recent ruling of the Federal Constitutional Court of Germany (BvR, 2020). Even if conducting successful traditional monetary policies is generally considered essential for maintaining price stability or reducing unemployment

under a certain threshold (El Alaoui et al., 2019), they show lacks in further supporting economic activities considering that the low interest rates environment lasts since the 2008-2011 crises. Additionally, even if the level of public debt cannot be considerate as a decisive factor in limiting the economic growth of an advanced Country (Panizza and Presbitero, 2014), a strong and traditional public fiscal stimulus following current rules is a complex option. All else be equal, a simultaneous increase of government deficit and contraction of GDP would produce a lethal combination for debt/GDP ratios. Especially, this holds for Countries within currency unions and highest public debt/GDP ratios (Afonso et al., 2019). Central Bank (CB) would respond through asymmetric interest rates for sovereign debts issued on behalf of different Countries increasing the spreads. Recent applied studies highlight the relationship between monetary policy and corporate bankruptcies (Sarikov and Kuprianov, 2020), fiscal and monetary policy shocks on debt management variables (Hodula and Melecký, 2020) and the trade-off between public debt stabilization and household welfare (Jesus et al., 2020). Whether such conditions should last, because of the lack of labor mobility (Meade, 1957) interest gaps would be very dangerous for the continuation of the union. Under a fixed exchange rate system one of the conditions of existence of an optimal currency area would be violated (Mundell, 1961). Similar concerns hold for private debt too, and its excessive level can be considered as detrimental for economies. Arcand et al. (2015) found negative effects on output growth when a threshold of about 100% of GDP has reached. At this point, both monetary and fiscal policies seem unfitted in their role. In the EU, for example, current instruments failed in reaching harmonized, stable and fair economic goals. Within the EU zone, the speed of convergence and economic conditions are recently analyzed for example by Marelli et al. (2019). The case of the application of the European Stability Mechanism (ESM) in the Greek crisis raised several criticism for effects on the whole socio-economic Hellenic structure and people standard living conditions.

Within current debate, the possibility to adopt unconventional monetary measures is authoritatively introduced and discussed in the recent contributions by Blanchard and Pisani-Ferry (2020) or Giavazzi and Tabellini (2020). A recent investigation for new Euro area member states is proposed by Fisera and Kotlebova (2020). Due to the extraordinary nature of the current crisis, the "forgotten" role of a possible monetization of public debt arises as a renewed instrument for financing fiscal policy. Monetization consists in the direct purchase by CB of Government Bonds issued to finance Government public spending to exploit the fiscal keynesian multiplier and sustain (or stimulate) output growth. Such a choice is an important option for those Countries having their own CBs and currency (i.e. Japan, UK and USA). An analysis of recent unconventional monetary policy for the USA is presented by Wang (2019). Different is the case of EU considering the complexity of its functioning and Treaty. At the moment for example, following current rules, this possibility is not allowed (art. 123 TFEU). As a proposal, however, monetary finance of deficits seems to gain growing acceptance for the EU zone (De Grauwe and Diessner, 2020). It should be noted that atavistic prejudices resist this option, and preconceptions are substantially linked to the Quantitative Theory of Money (QTM). The Nobel Prize Winner Milton Friedman is closely associated with such a theory also called "Monetarism" (1963a,b), that under a formula representation can be proposed as:

$$M\,V = P\,Y \quad (1)$$

wherein:

- M is the quantity of money;

- V is the velocity of money (average number of times that money moves from one entity to another over the course of a year);

- P is the price level;

- Y is the real output.

The equation (1) can be written considering the percentage change over time of each of the four terms, thus:

$$m + v = \pi + y \quad (2)\,.$$

Briefly, the QTM implies that any increase in quantity of money supplied *m* will not have any effect (neutrality of money) on the total output (and related employment) and, thus, following the Friedman's (1963a) dictatum: "Inflation is always and everywhere a monetary phenomenon" (Davidson, 2015). Substantially, for monetarists, the terms *v* and *y* are not relevant and the (2) can be assumed as: $m = \pi$ (and/or inversely $\pi = m$) originating the fear of dangerous inflationary growth for changes in money supply.

3. Methodology and data

Starting from these premises and to investigate and trace out (potential) transmission effects originated by money growth on inflation at a system level (*m* vs π assuming as irrelevant neither *y* nor *v* as previously stated), we follow a Granger-causality methodology (1969). Even if the *post hoc ergo propter hoc* fallacy cannot be excluded in whatsoever econometric "causality test", our aim is to explore if one variable (*x*) is of help in predicting the other one (*y*) or as commonly stated if *x* "Granger-causes" *y* (the peculiar notation $x \rightarrow y$ is adopted to represent by symbols such a proposition). Therefore, in time series analysis, Granger test will allow us to verify that a process x_t Granger causes y_t at the order *p* if in the linear regression of the y_t on lagged values $x_{t-1}, \ldots, x_{t-p}, y_{t-1}, \ldots, y_{t-p}$ at least one of the regression coefficients of x_t on the lagged values $y_{t-1}, \ldots, y_{t-p}$ is significantly different from 0. This causality is examined by the null hypothesis H_0 that all regression coefficients of x_t on the lagged values $y_{t-1}, \ldots, y_{t-p}$ are null. A *p-value* higher than 0.05 (*F*

statistics) means that H_0 can be accepted (hence, causality rejected) with 95% confidence level (Chevallier and Ielpo, 2013).

Neutral money theory postulates that any increase in the quantity of money supplied will not affect the (predetermined) total GDP or employment in that future period (Davidson, 2015). Following this idea of a merely monetary nature of inflation- our goal is to understand if the money growth (x) → inflation (y) transmission mechanism is empirically plausible. Consequently, variables are tested in both directions ($x \rightarrow y$ and $x \leftarrow$ y) examining their lead-lag relationships. Accordingly, the following equations (3) and (4) are estimated, when data are non-stationary in levels:

$$\Delta M_t = \phi_1 + \sum_{i=1}^{m} \sigma_i \Delta M_{t-i} + \sum_{j=1}^{n} \theta_j \Delta INFL_{t-j} + e_t^M \quad (3)$$

$$\Delta INFL_t = \phi_2 + \sum_{i=1}^{m} \sigma_i \Delta INFL_{t-i} + \sum_{j=1}^{n} \theta_j \Delta M_{t-j} + e_t^{INFL} \quad (4)\ .$$

where *INFL* and *M* represent respectively the inflation and the variation in monetary aggregates. In the equations (3) and (4). By using first differences (Δ), stationarity can be guaranteed; ϕ is the intercept and e_t is the error term. The *BIC* information criteria is selected to determine the most appropriate VAR lag-structure in each model. The residual sum of squares of models are then compared using an *F*-test to reject the respective null hypothesis (H_0 = money growth does not Granger-cause inflation and viceversa). To determine the most appropriate lag-structure (m, n) for each model, we select the *BIC* information criteria.

Moreover, a Wald-type instantaneous causality procedure is proposed to test for non-zero correlation between the error processes of the cause and effect variables (Lütkephol, 2006). In this latter case the null for non-instantaneous causality is defined as $H_0 : C\sigma$, where:

- C is a matrix of rank N selecting the relevant covariance of residual errors e_{1t} and e_{2t};

- $\tilde{\partial}$ is the column-stacking operator *vech* ($\widehat{\Sigma e}$).

The Wald statistic is asymptotically distributed as χ^2 *(N)* and can be described by:

$$\lambda_W = T\,\tilde{\partial}' C' [2C D_K^{+}(\widehat{\Sigma e} \otimes \widehat{\Sigma e})\, D_K^{+} C']^{-1} C\tilde{\partial} \quad (5)$$

where the Moore-Penrose inverse of the duplication matrix D_K is assigned by D_K^{+} and $\widehat{\Sigma e} = 1/T \sum_{t=1}^{T} e_t\, e_t'$. The D_K has dimension $[K^2 \times 0.5K(K+1)]$ and is defined such that the column-stacking operator *vech* (*A*) is equal to the D_K *vech* (*A*) for any symmetric *(K × K)* matrix *A* (Pfaff, 2008).

Additionally, a Vector Error Correction Model (*VECM*) is used when variables contain unit roots with stationary first differences and cointegration properties (Fanchon and Wendel, 1992). Due to high responsiveness to deviations from the long-run equilibrium of cointegrated variables, a *VECM* is appropriated in dynamic analysis. To this aim, the statistical significance of *Error Correction Terms* (*ECT*, α_{11} and $\underline{\alpha_{21}}$) is considered in the long-run cointegration relationship estimating the subsequent equations (6) and (7):

$$\Delta M_t = \gamma_{10} + \alpha_{11}\,(M_{t-1} - \beta_0 - \beta_1\, INFL_{t-1}) + v_t^{M} \quad (6)$$

$$\Delta\, INFL_t = \gamma_{20} + \alpha_{21}\,(M_{t-1} - \beta_0 - \beta_1\, INFL_{t-1}) + v_t^{INFL} \quad (7)$$

wherein $(M_{t-1} - \beta_0 - \beta_1\, INFL_{t-1})$ is the cointegrating vector .

As far as analyzed the data framework is concerned, the following industrial Countries are included: Italy, Japan, United Kingdom and United States.

The case of Italy is consistent with the broad public perception that sovereign debt is high (even if this level is not so decisive as previously stated).

Instead, Japan has a public debt as a percentage of GDP even higher than Italy and a high money supply. The United Kingdom and the USA are examples of financial advanced Countries.

Additionally, we investigate also Argentina and Bolivia that have experienced hyperinflation periods. Our selection is also driven by the availability of suitable datasets to process. There are difficulties in gathering sufficiently long historical series for important EU Countries. Sources are different, because there is not a single international database that collects all the required homogeneous values.

Monetary aggregates include both narrow money M1 (where available) because most economists consider its growth rate as the key driver for inflation and broad money M2 as Friedman (1963a) advocated (Cukierman, 2017). The M4 variable is selected for United Kingdom since this aggregate is usually monitored by the Monetary Policy Committee (Ellington and Milas, 2019).

More in detail, the overall list includes:

-Italy yearly M1 and M2 growth (respectively labeled as ITA_M1 and ITA_M2) (Barbiellini Amidei et al, 2016) and Consumer Price Index (labeled as ITA_INFL) (IMF, 2020a and it.inflation.eu, 2020) from 1956 to 2014;

-Japan yearly M1 and M2 growth labeled as JPN_M1 (OECD, 2020) and JPN_M2 (World Bank, 2020a) combined with Consumer Price Index (labeled as JPN_INFL) (World Bank, 2020a and it.inflation.eu, 2020) from 1960 to 2019 (M1 vs Inflation) and from 1961 to 2016 (M2 vs Inflation§);

-United Kingdom yearly M1 an M4 growth labeled as UK_M1 (Bank of England, 2020a) and UK_M4 (IMF, 2020b) paired with Consumer Price Inflation labeled as UK_INFL (Bank of England, 2020c) from 1923 to 2016 (M1 vs Inflation) and from 1881 to 2016 (M4 vs Inflation§);

-USA yearly M1 and M2 growth labeled as USA_M1 (IMF, 2020c) and USA_M2 (Board of Governors, 2020) combined with Consumer Price Index (labeled as USA_INFL) (World Bank, 2020b) from 1961 to 2017 (M1 vs Inflation) and from 1961 to 2019 (M2 vs Inflation§);

-Argentina yearly M2 growth labeled as ARG_M2 (World Bank, 2020a) paired with Inflation Consumer Prices labeled as ARG_INFL from 1970 to 2013 (World Bank, 2020c);

-Bolivia yearly M2 growth labeled as BOL_M2 (World Bank, 2020a) coupled with Inflation Consumer Prices for the Plurinational State of Bolivia labeled as BOL_INFL from 1970-2019 (World Bank, 2020d).

The selection of yearly data is coherent with the need of investigating a long-period in the money supply-inflation relationship. Using higher frequency observations, like for example in the case of monthly and/or quarterly figures, increases the likelihood of finding (spurious) causal relationship (Schwarz and Szakmary, 1994). Thus, considering that cointegration relationships among the series could exist, the limitation of the analysis to a shorter time-span (like for example the 70s or the 80s) -even in presence of more frequent observations- has no particular meaning in such a system perspective. Our choice seems a reasonable mid-point side between more extreme positions. The Granger procedure defines the significance of the causality (Kalai, 2021).

Data are graphed from Figure 1 to Figure 7, wherein the right *y*-axis report Inflation data.

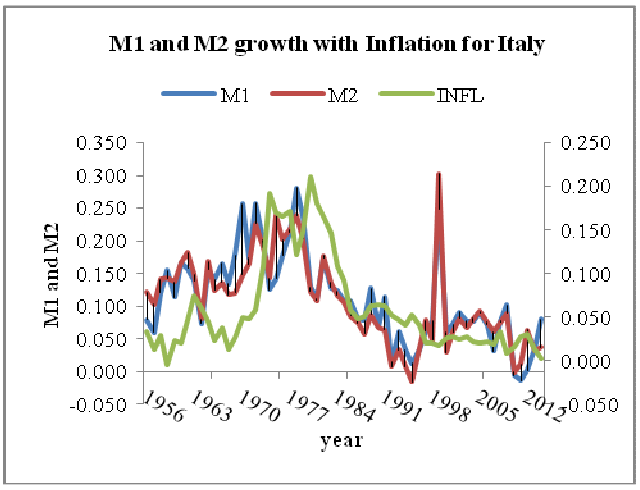

Fig. 1 - M1 and M2 growth with Inflation for Italy
Source: Personal elaboration on data

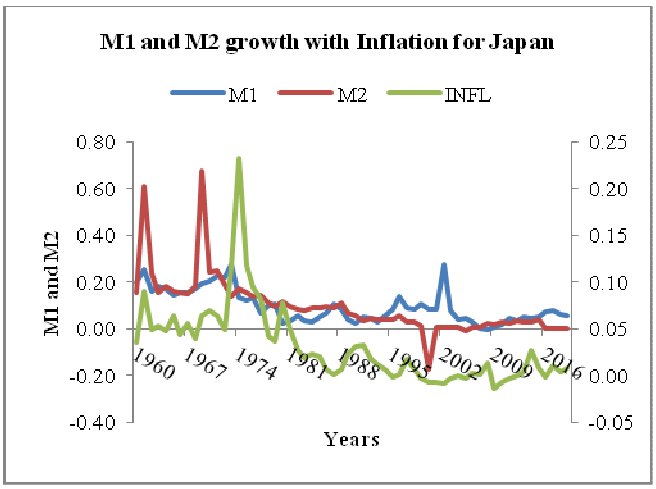

Fig. 2 - M1 and M2 growth with Inflation for Japan
Source: Personal elaboration on data

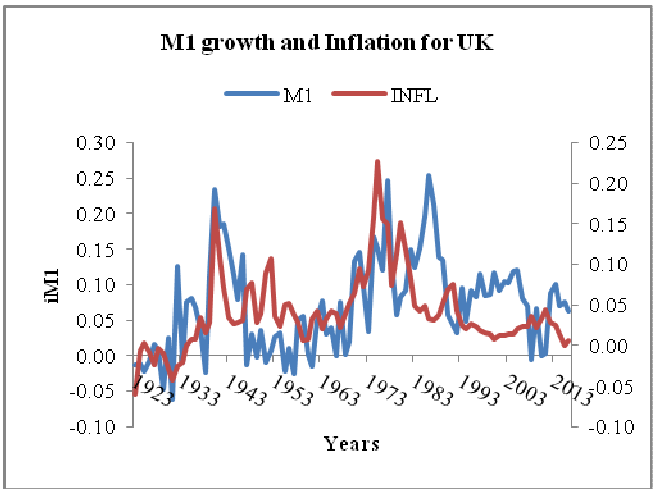

Fig. 3 - M1 growth with Inflation for UK
Source: Personal elaboration on data

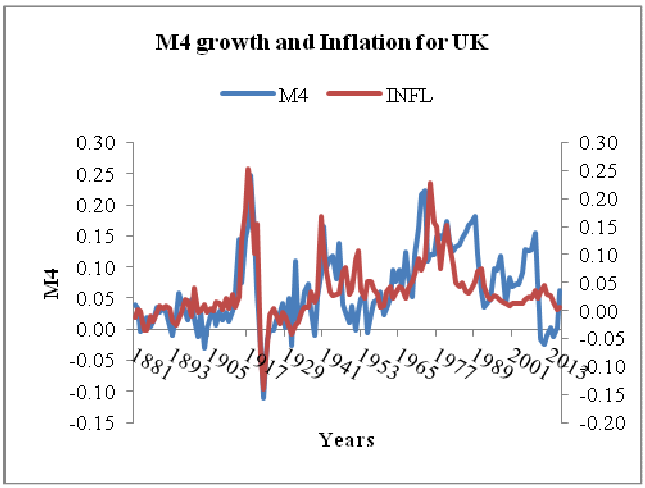

Fig. 4 – M4 growth with Inflation for UK
Source: Personal elaboration on data

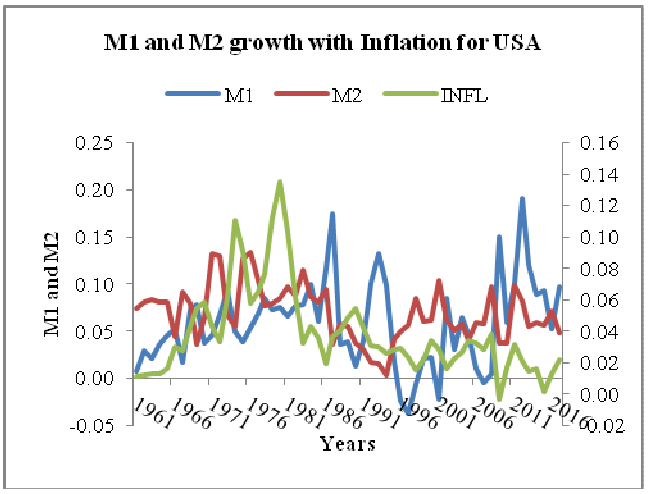

Fig. 5 – M1 and M2 growth with Inflation for USA
Source: Personal elaboration on data

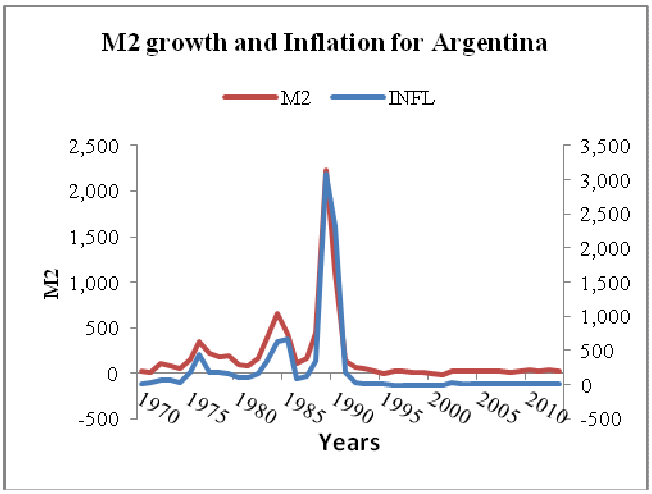

Fig. 6– M2 growth with Inflation for Argentina
Source: Personal elaboration on data

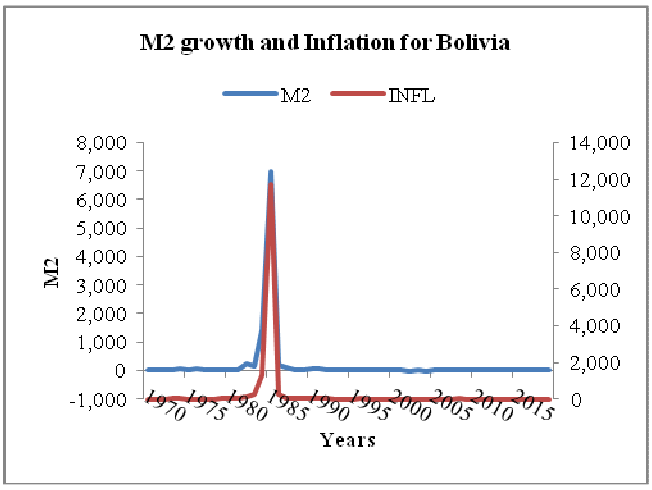

Fig. 7 – M2 growth with Inflation for Bolivia
Source: Personal elaboration on data

In Table 1 four among the most widespread and well-known unit root tests (Augmented Dickey-Fuller: ADF, Augmented Dickey-Fuller Generalized Least Squares Regression: ADF-GLS, Kwiatkowsky-Phillips-Schmidt-Shin: KPSS and Phillips-Perron: PP) are applied to investigate the stationarity properties of the time series.

Table 1-Unit root test for the data *(to be continued)*

Series	ITA_M1	ITA_M2	ITA_INFL	JPN_M1	JPN_INFL	JPN_M2	JPN_INFL§
Time period	1956-2014	1956-2014	1956-2014	1960-2019	1960-2019	1961-2016	1961-2016
Unit root test							
ADF with const	-3.49	-2.19	-1.49	-3.02	-2.71	-3.71	-2.73
p-value ($\alpha = 0.05$)	0.01*	0.21	0.53	0.04*	0.08	0.00*	0.08
ADF with const and trend	-4.66	-5.11	-1.73	-3.85	-3.88	-4.89	-3.58
p-value ($\alpha = 0.05$)	0.00*	0.01*	0.72	0.02*	0.03*	0.00*	0.04
ADF_GLS τ	-1.33	-2.34	-1.62	-2.23	-2.43	-5.12*	-3.63*
Critical value ($\alpha = 0.05$)	-3.03	-3.03	-3.03	-3.03	-3.03	-3.03	-3.03
KPSS test	0.85	0.87	0.37*	0.89	0.98	1.16	0.96
Critical value ($\alpha = 0.05$)	0.46	0.46	0.46	0.46	0.46	0.46	0.46
PP Test Z τ	-3.40	-3.74	-1.65	-2.83	-2.53	-3.94	-2.62
p-value ($\alpha = 0.05$)	0.01*	0.01*	0.45	0.06	0.11	0.00*	0.10

Source: Personal elaboration on data
BIC Criterion for ADF and ADF_GLS

*** indicates stationarity at 5% level**

Table 1-Unit root test for the data *(to be continued)*

Series	UK_M1	UK_INFL	UK_M4	UK_INFL§	USA_M1	USA_INFL	USA_M2
Time period	1923-2016	1923-2016	1881-2016	1881-2016	1961-2017	1961-2017	1961-2019
Unit root test							
ADF with const	-4.76	-3.53	-4.21	-4.15	-4.44	-2.01	-4.29
p-value ($\alpha = 0.05$)	0.00*	0.00*	0.00*	0.00*	0.00*	0.28	0.00*
ADF with const and trend	-4.92	-3.42	-4.56	-4.19	-4.44	-3.56	-4.67
p-value ($\alpha = 0.05$)	0.00*	0.06	0.00*	0.01*	0.00*	0.03*	0.00*
ADF_GLS τ	-3.07*	-1.54	-4.56*	-4.15*	-1.48	-1.46	-1.94
Critical value ($\alpha = 0.05$)	-3.03	-3.03	-2.93	-2.93	-3.19	-3.03	-3.03
KPSS test	0.48	0.36	0.79	0.39*	0.14*	0.47	0.49
Critical value ($\alpha = 0.05$)	0.46	0.46	0.46	0.46	0.46	0.46	0.46
PP Test Z τ	-4.66	-3.43	-4.20	-4.25	-4.44	-2.38	-4.18
p-value ($\alpha = 0.05$)	0.00*	0.01*	0.00*	0.00*	0.00*	0.15	0.00*

Source: Personal elaboration on data
BIC Criterion for ADF and ADF_GLS
*** indicates stationarity at 5% level**

Table 1-Unit root test for the data

Series	USA_INFL§	ARG_M2	ARG_INFL	BOL_M2	BOL_INFL
Time period	1961-2019	1970-2013	1970-2013	1970-2019	1970-2019
Unit root test					
ADF with const	-2.04	-3.58	-4.38	-5.62	-6.15
p-value ($\alpha = 0.05$)	0.27	0.01*	0.00*	0.00*	0.00*
ADF with const and trend	-3.63	-3.68	-4.48	-5.66	-6.18
p-value ($\alpha = 0.05$)	0.03*	0.03*	0.00*	0.00*	0.00*
ADF_GLS τ	-1.48	-3.67*	-3.62*	-5.73*	-6.26*
Critical value ($\alpha = 0.05$)	-3.03	-3.19	-3.19	-3.19	-3.19
KPSS test	0.49	0.23*	0.19*	-0.15	0.14*
Critical value ($\alpha = 0.05$)	0.46	0.46	0.46	0.46	0.46
PP Test Z τ	-2.39	-3.48	-3.45	-5.61	-6.15
p-value ($\alpha = 0.05$)	0.15	0.01*	0.01*	0.00*	0.00*

Source: Personal elaboration on data
BIC Criterion for ADF and ADF_GLS
*** indicates stationarity at 5% level**

As can be appreciated series are non-stationary in levels, except in the case of UK_M4, UK_INFL§, ARG_M2, ARG_INFL, BOL_M2 and BOL_INFL, thus we proceed with first differencing for all non-stationary ones to achieve stationarity (Table 2).

Table 2-Unit root test for the first difference series of data reported in italics (*to be continued*)

Series	*ITA_M1*	*ITA_M2*	*ITA_INFL*	*JPN_M1*	*JPN_INFL*	*JPN_M2*	*JPN_INFL§*
Time period	1956-2014	1956-2014	1956-2014	1960-2019	1960-2019	1961-2016	1961-2016
Unit root test							
ADF with const	-10.63	-8.56	-7.00	-7.91	-7.52	-13.63	-7.22
p-value (α = 0.05)	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*
ADF with const and trend	-10.57	-8.51	-7.07	-7.86	-7.44	-13.65	-7.15
p-value (α = 0.05)	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*
ADF_GLS τ	-10.42*	-12.60*	-3.47*	-9.35*	-7.14*	-2.58	-7.38*
Critical value (α = 0.05)	-3.03	-3.03	-3.03	-3.03	-3.03	-3.03	-3.03
KPSS test	0.07*	0.06*	0.13	0.06*	0.06*	0.04*	0.05*
Critical value (α = 0.05)	0.46	0.46	0.46	0.46	0.46	0.46	0.46
PP Test Z τ	-11.65	-14.56	-7.00	-11.04	-9.68	-14.79	-8.74
p-value (α = 0.05)	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*

Source: Personal elaboration on data
BIC Criterion for ADF and ADF_GLS
*** indicates stationarity at 5% level**

Table 2-Unit root test for the first difference series of data reported in italics (*to be continued*)

Series	*UK_M1*	*UK_INFL*	*USA_M1*	*USA_INFL*	*USA_M2*	*USA_INFL§*
Time period	1923-2016	1923-2016	1961-2017	1961-2017	1961-2019	1961-2019
Unit root test						
ADF with const	-14.22	-9.01	-9.46	-7.09	-9.96	-7.24
p-value (α = 0.05)	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*
ADF with const and trend	-14.16	-9.02	-9.40	-7.13	-9.86	-7.27
p-value (α = 0.05)	0.00*	0.00*	0.00*	0.00*	0.00*	0,00*
ADF_GLS τ	-12.63*	-7.73*	-9.37*	-6.26*	-8.89*	-6.41*
Critical value (α = 0.05)	-3.03	-3.03	-3.03	-3.03	-3.03	-3.03
KPSS test	0.07*	0.13*	0.04*	0.11*	0.05*	0.11*
Critical value (α = 0.05)	0.46	0.46	0.46	0.46	0.46	0.46
PP Test Z τ	-15.21	-10.07	-10.18	-6.09	-10.88	-6.22
p-value (α = 0.05)	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*

Source: Personal elaboration on data
BIC Criterion for ADF and ADF_GLS
*** indicates stationarity at 5% level**

Since these series are non-stationary in levels, but integrated of order one, we have to propose also the cointegration tests (Table 3 and Table 4 with the Johansen test and the Engle-Granger procedure).

Table 3- Johansen cointegration tests of paired series

Paired Series	Lag order	Rank	Trace test	p-value	λ max	p-value
ITA_M1 vs ITA_INFL	1	0	22.93	0.00	20.76	0.00
		1	2.18	0.14*	2.18	0.14*
JPN_M1 vs JPN_INFL	1	0	32.45	0.00	26.32	0.00
		1	6.13	0.01	6.13	0.01
UK_M1 vs UK_INFL	1	0	39.78	0.00	28.02	0.00
		1	11.76	0.00	11.76	0.00
USA_M1 vs USA_INFL	1	0	23.78	0.00	18.10	0.01
		1	5.68	0.02	5.68	0.02
ITA_M2 vs ITA_INFL	1	0	24.46	0.00	22.60	0.00
		1	1.86	0.17*	1.86	0.17*
JPN_M2 vs JPN_INFL	1	0	32.82	0.00	27.41	0.00
		1	5.41	0.02	5.41	0.02
USA_M2 vs USA_INFL	2	0	28.28	0.00	24.13	0.00
		1	4.15	0.04	4.15	0.04

Source: Personal elaborations on data
*** Indicates cointegration at 5% level.**
Lag order is defined with *BIC* criterion

Table 4- Engle-Granger cointegration tests of paired series

Paired Series	Lag order	ADF	p-value	ADF	p-value	Residuals	p-value
ITA_M1 vs ITA_INFL	1	-2.54	0.11	-1.70	0.43	-3.45	0.04*
JPN_M1 vs JPN_INFL	1	-2.69	0.07	-2.49	0.12	-3.58	0.03*
UK_M1 vs UK_INFL	1	-3.45	0.01	-3.30	0.01	-3.95	0.00
USA_M1 vs USA_INFL	1	-3.74	0.00	-3.00	0.03	-3.78	0.01
ITA_M2 vs ITA_INFL	1	-2.18	0.21	-1.70	0.43	-3.15	0.08**
JPN_M2 vs JPN_INFL	1	-3.71	0.00	-2.30	0.17	-4.79	0.00
USA_M2 vs USA_INFL	2	-2.29	0.17	-2.04	0.27	-2.91	0.13

Source: Personal elaborations on data
*** Indicates cointegration at 5% level.**
**** Indicates cointegration at 10% level**
Lag order is defined with *BIC* criterion

4. Elaborations and findings

Starting from these premises, we perform the Granger-causality test to analyze the potential lead-lag relationship between money growth and inflation. Results are summarized in Table 5, where the *F* statistics resulting from the Granger test are showed jointly with non-instantaneous Wald statistics (λ_W statistics). When series are cointegrated, the *VECM* and its corresponding *ECT* is reported.

Taking a closer look at the results, we find that there is no evidence of a Granger-causal relationship in all analyzed couples for the various cases. However, two different kind of outcomes can be found.

More in detail, as far as the first case is concerned (ITA_M1 and M2, JPN_M1, UK_M4, ARG_M2 and BOL_M2 vs respective inflation data), it is possible to point out that money Granger-causes inflation, but -at the same time- the inverse relationship holds. Considering such outcomes it is not possible to foster the hypothesis of a clear Granger-casual relationship between the variables representing the strictly monetary theory. Non-instantaneous causality holds in all these cases except for Argentina and Bolivia. On this aspect, while the money → inflation economic interpretation can be directly derived from Friedman's theory (too much money is chasing too few goods), an explanation of the reverse direction (inflation → money) is less intuitive. Such a reverse case is plausible when fiscal revenues sharply decline jointly with negative shocks on the supply-side like for example in war periods or following exogenous events (as for oil shocks in the 70s). In these occurrences affecting the whole economic system, Governments' possibilities to finance public spending are limited and increasing costs force new money issuances. This supports the endogenous nature of money hypothesis. Wald tests suggest the non-instantaneous null hypothesis as true. In the cases of Argentina and Bolivia λ_W does not support the null of no instantaneous

causality. These last two Wald test findings support the idea of the existence of an empirical sequence between events, and they are opposite to the outcome of the Granger procedure.

As far as the second case is concerned (the remaining couples), findings do not support any statistical evidence between variables. These shortcomings in representing a potential lead-lag relationship between money and inflation seems to stem the supposed intrinsic link as emphasized by monetarist theory. In our calculations, the USA case points out contradictory outcomes between Granger and Wald test.

Table 5 – Results of bidirectional Granger-causality and Wald tests for M1 or M2 inflation relationships

M1/M2 as an independent variable			INFL as an independent variable		
	F / **ECT**	p-value		F / **ECT**	p-value
M1					
(ITA_M1 > INFL_ITA) lag1	**-0.12**	0.00*	(ITA_M1 < INFL_ITA) lag 1	**0.27**	0.00*
(JPN_M1 > INFL_JPN) lag1	6.03	0.02*	(JPN_M1 < INFL_JPN) lag1	6.27	0.00"
Wald statistics	1.67	0.19	Wald statistics	1.67	0.19
(UK_M1 > INFL_UK) lag1	1.06	0.31	(UK_M1 < INFL_UK) lag1	1.97	0.16
Wald statistics	1.31	0.25	Wald statistics	1.31	0.25
(USA_M1 > INFL_USA) lag1	2.52	0.12	(USA_M1 < INFL_USA) lag1	0.82	0.37
Wald statistics	1.31	0.25	Wald statistics	1.31	0.25
M2 (M4 for UK)					
(ITA_M2> INFL_ITA) lag1	**-0.49**	0.00*	(ITA_M2 < INFL_ITA) lag1	**0.14**	0.00*
(JPN_M2 > INFL_JPN) lag1	0.02	0.89	(JPN_M2 < INFL_JPN) lag1	0.74	0.39
Wald statistics	1.39	0.24	Wald statistics	1.39	0.24
(UK_M4 > INFL_UK) lag1	8.22	0.00*	(UK_M4 < INFL_UK) lag1	5.74	0.02*
Wald statistics	2.99	0.08	Wald statistics	2.99	0.08
(USA_M2 > INFL_USA) lag2	2.65	0.08	(USA_M2< INFL_USA) lag2	0.88	0.42
Wald statistics	4.19	0.04*	Wald statistics	4.19	0.04*
(ARG_M2 > INFL_ARG) lag2	11.52	0.00*	(ARG_M2 < INFL_ARG) lag2	6.58	0.00*
Wald statistics	20.53	0.00*	Wald statistics	20.53	0.00*
(BOL_M2 > INFL_BOL) lag4	160.48	0.00*	(BOL_M2 < INFL_BOL) lag4	124.13	0.00*
Wald statistics	22.62	0.00*	Wald statistics	22.62	0.00*

Source: Personal elaborations on data
Note: * denotes statistical 5% significance of the relationship. Bold figures are for the relationships where Granger-causality is evaluated by a *VECM* due to cointegration between variables. In such cases corresponding *ECT* terms are proposed. Lag order is selected by *BIC*

5. Conclusion remarks

This economic crisis will severely affect living standard and economic conditions for people all over the World. For these reasons, it is necessary (and urgent) to find suitable actions capable of alleviating the negative consequences of shocks as much as possible. Fiscal policies and conventional monetary instruments appear as not adequate to this unexpected situation. Several Countries have no "fiscal space" to intervene with appropriate measures without raising their own debt/GDP ratio. Nevertheless, the increasing globalization and interconnection of the whole system does not help to foster the economies. Maybe, globalization itself is one side of the coin. Especially, this holds true for export-leaded Countries. Unconventional proposals such as monetization to finance fiscal policies appear among the possible solutions. Several Countries with their own currency and CB are already moving towards such a direction. When European Central Bank (ECB) launched its large-scale bond buying program in 2015, the Federal Reserve and the Bank of Japan had started on years before (Balcilar et a., 2020; Tooze, 2020). Now, also the Bank of England strongly followed this option (Lops, 2020). This choice seems the only action to implement without having to unjustly further affect the condition of the populations. Ensuring a sufficient and stable flow of liquidity appears as the most appropriate solution to prevent a sudden-stop of economic activities in a system logic. Through the Pandemic European Purchase Programme (PEPP), the ECB is now moving towards such a direction supplying the EU Countries with the necessary liquidity. But for the future, will it last? Thus, the main concerns are for EU zone, where proposed programs do not fit all needs considering the differences between Countries. Taking as an example EU issues, the "frugal four" (Austria, Denmark, Netherlands and Sweden) are unlikely to accept debt sharing, and this is understandable. Surely, also for Germany the same condition holds. However, what is less understandable is their opposition to "money printing" by ECB. Considering

that this reduce the cost of servicing debt (Kim, 2020) and does not increase inflation, this fideistic position is really detrimental for the EU zone as a whole.

As authoritative speakers sustain: "It's time we break free from the narrative of the "lazy" South and the "hard-working" North. Europe's north has benefited hugely from the common currency. According to calculations by Bertelsmann Stiftung those that have benefited the most from the internal market are Germany, along with Scandinavian, Baltic and Benelux Countries – in no small part thanks to a relatively undervalued euro" (De Croo, 2020). As our empirical findings show (in all the proposed cases) -confirming similar outcomes from previous literature on the topic (Gerlach and Svensson, 2003 and Nicoletti Altimari, 2001)- the fear of inflation is (probably) excessive. Further to inspiring the title of this paper, the Blanchard's (1990) opinion -"All the models we have seen impose the neutrality of money as a maintained assumption. This is very much a matter of faith, based on theoretical considerations rather than on empirical evidence"- cannot be ignored. For all those advocating a strict money growth-inflation relationship coherent with traditional monetarist theory, it must be highlighted that current scenario can hardly be compatible with whatsoever kind of inflationary pressure in the short (or medium) term. As a matter of fact, due to an overall contraction in economic activity it is plausible to expect a combination of low commodities prices and high unemployment rates. Taking the commodity side and considering oil as an example, the WTI 3-months future experienced an unprecedented historical record low of -37.63 $/bbl at closing quotation on April, 20th last (with a negative percentage change on previous day equal to -306%!). Such a depressed mix can hardly support the fear of an economic environment coherent with high price expectations in the very next short-run. Additionally, as empirical recent studies show (Canzoneri et al., 2016), the fiscal multiplier in depression is higher than in the case of expansion. This has as a necessary corollary that if the private spending is low (as a result of pandemic crisis), then Government must sustain the market even with budget deficits

(Davidson, 2015) to efficiently counteract the fall in GDP. All the conditions are simultaneously present to finance these deficits through monetization. To face such an unforeseeable scenario and to reduce (or alleviate) the inherent social consequences, the adoption of all available and (perhaps forgotten) unconventional macroeconomic policy instruments appears desirable to avoid deep recession or minimizing that detrimental impacts can last for years. Quite recent recipes have not achieved the desired effect to conduct the Countries towards a stable growth path, as an example in the case of Italy already predicted by some authoritative authors (Bagnai, 2011). All over the western Countries, the tendency of wage restraint has diminished in a dangerous manner the domestic consumption levels (Elsenhans, 2019 and Batra, 2015) highlighting the classical dilemma of the external equilibrium (De Jesus and Lopez, 2019). These policies have depressed at the same time both domestic GDP and tax revenues increasing the debt/GDP ratio (instead to reduce it as announced). Fiscal consolidation packages has caused a slowdown in economic activity (Gomes da Silva and Vilela Vieira, 2017). Monetization is one possibility (maybe the only) able to rapidly and efficiently address such needs, for example by reducing the cost of servicing debt and leaving fiscal "space" to manage the crisis. Obviously this idea is not new (Wray, 1997). Currency unions experience important difficult in coping with external shocks in the absence of a federal government (Krugman, 2013). The present analysis does not confirm that money can generate inflation in a direct transmission mechanism also within a long time span. Additional factors as supply-shocks are interlinked to excessive growing price paths in current economic conditions. May money be the first part of a complex solution?

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